

SCIENCE & GOVERNMENT REPORT

16th Year of Publication

The Independent Bulletin of Science Policy

Volume XVI, Number 18

P.O. Box 6226A, Washington, D.C. 20015

November 15, 1986

NIH Inches Toward Involvement

Part II: Chronicle of a Scientific Misconduct Case

Continuing the report that began in the preceding issue about a scientific misconduct case that has been inconclusively under investigation by the National Institutes of Health since 1982.

In June 1982, the National Institutes of Health agreed to consider looking into the charges of scientific misconduct that Dr. Jerome G. Jacobstein, MD, had brought against his former colleague at Cornell University Medical College, Dr. Jeffrey S. Borer, MD.

Borer, a precociously successful cardiology researcher, insisted that the charges were baseless. An inquiry at Cornell had exonerated him in December 1981, and university officials intimated that his accuser was motivated by personal animosity and professional envy. The two had been scrapping prior to Jacobstein's allegations of misconduct. Borer would often refer to himself as "Director" of the Laboratory of Nuclear Cardiology; Jacobstein asserted that they were serving as "Co-Directors." Rebuffed by what he termed a "coverup" and a "whitewash" by the Cornell authorities, Jacobstein engaged a Washington attorney experienced in the folkways of both science and federal agencies, Harold P. Green.

As later depicted by Green, Jacobstein, rather than being a petty spoiler, had "come forward as a matter of personal conscience and scientific responsibility, with great risk to his career and at great dollar cost." Jacobstein, in the course of the ensuing NIH inquiry, stated that "if my allegations are correct, Dr. Borer not only misrepresented research data but may have induced several of his students and trainees to do likewise, thus violating one of the most sacred trusts of a scientist and teacher." Careers and institutional credibility were clearly becoming the stakes in this matter.

The controversy between the two scientists was complex in substance and reeking with personal overtones. Jacobstein, socially awkward and excitable in conversation, once described Borer as "an extremely powerful person, he's got charisma, he's got strength of personality . . ." At the time Jacobstein presented his charges to the Cornell dean, arrangements were near completion for Borer to receive the endowed chair in cardiology he now holds at New York Hospital-Cornell Medical Center. Meanwhile, Jacobstein was preparing to leave Cornell for his present post, Director of Nuclear Medicine

at Graduate Hospital, Philadelphia.

It was difficult to ignore the human aspects in the Jacobstein-Borer contention, and they regularly come up in informal as well as official discussions of the case. But the issue was not likability or motivation. Jacobstein had raised serious charges against Borer, contending that Borer had directed a medical student to misstate the methodology employed in a research project that the student had written up for presentation at a professional meeting. The three-member panel of inquiry appointed by the Cornell medical dean had decided that "the charges do not warrant further action." But the "investigation," as Cornell termed it, had been a once-over-lightly affair, conducted in one long afternoon and

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In Brief

Johns Hopkins tops the latest list of academic recipients of federal R&D funds, with \$429 million in fiscal 1985. But the Hopkins bounty isn't as plump as it looks since the sum includes \$305 million from the Pentagon, most of it for running the Navy's Applied Physics Laboratory. Hopkins' bookkeepers fictionalize the goliath lab as a just another part of the university.

Which means that the real winner is MIT, with \$187 million; \$42 million of that came from DoD, but it was for on-campus activities. Stanford was third, with \$174 million. These numbers, and lots more, are in NSF's "Early Release of Summary Statistics on Academic Science/Engineering Resources" (available without charge from NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20015; tel. 202/634-4673).

Issues, the quarterly ponderosity of the National Academy of Sciences, is approaching a critical point. With the journal's circulation an anemic 12,000 despite hard promotion and an upswing in editorial quality, the thrift-minded NAS is anguishing under a \$300,000-a-year hosing from the venture and may pull the plug if a campaign for handouts doesn't ease the deficit.

Meanwhile, *Issues* editor Allen L. Hammond continues in place, following the AAAS's needless scuttling of the other magazine he was simultaneously editing, *Science86*. But Hammond says he's also exploring new editorial projects.

... NIH Confesses to Inexperience in These Matters

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evening session a week before Christmas. Some key witnesses were not called, essential laboratory documents were not examined, and the official record of the proceeding was one reconstructed from memory and written materials several months later at the demand of Jacobstein's attorney.

Following the verdict at Cornell, Jacobstein presented a pair of new charges against Borer: That in the only published paper on which the two had collaborated, Borer had, without Jacobstein's knowledge, invented a second "observer" on a cardiac research series, thus strengthening the appearance of rigorous methodology. He also claimed that Borer's contribution to the joint paper misstated the camera position employed in that cardiac-research series. Borer denied those charges too.

NIH could have sidestepped the case on the grounds that Cornell had found no misconduct in the original charges brought by Jacobstein. The new charge, concerning the camera and number of observers in their joint paper, presented a separate issue, since it was made after Cornell had completed its investigation. But, on both allegations, NIH could have begged off with the excuse that the only direct NIH involvement in these disputed matters was a trifling summer stipend for a student.

Sensitivity to Fraud Issue

However, it wasn't a good time for sweeping such matters under the administrative rug at Bethesda. In 1981, the year before lawyer Green solicited NIH's interest, a whopping case of fraud at Harvard Medical School—the notorious John Darsee affair—had evoked wide press notice. With that came Congressional curiosity about ethical conditions in the federally bankrolled house of science.

So, in response to Jacobstein's appeal, NIH replied that it would look into the case to determine whether an investigation was warranted. What NIH was to learn quickly was that this misconduct case was different from others. In other episodes involving allegations of misconduct, the accused either confessed and slunk out of sight—as did Harvard's Darsee—or was cleared by an investigation, by NIH or the home institution, and that ended it. But here was accuser Jacobstein, hanging on like a bulldog, accusing a major NIH grantee institution (\$30 million a year at that time for Cornell) of a scientific Watergate. Jacobstein defiantly argued: Think what you want about the personal element and Borer's professional eminence, there's a fundamental principle at stake—honesty in research. What if NIH brushed him

off and he went public with charges that were subsequently substantiated?

The allegations that NIH now pondered called for a police-type investigation. Jacobstein's charges could be confirmed or dispelled only by nailing down such matters as who was where and when, who said what to whom and who else was there—plus painstaking tracing of the paper trail that had been created in and around the research facilities used by Borer and his students. But NIH is not a cop agency. Traditionally preoccupied with its holy mission of supporting scientists, rather than investigating them, it had no firm procedures for probing misconduct charges, and it had no gumshoe types trained to get the facts on allegations of misdeeds.

"If Investigation is Needed"

Asked by Jacobstein's attorney to state the ground rules for its inquiry, NIH acknowledged its inexperience in this messy business. "Until recently," Dr. William F. Raub, Associate Director for Extramural Research and Training, wrote to Green, "NIH has not had enough cases of alleged misconduct in its research programs to develop a 'specified procedure' for handling information." Raub explained that "If we determine that a formal investigation is needed," his office would work with "appropriate investigative staff" and "outside consultants if necessary."

At that point, mid-July 1982, NIH wasn't very deep into the tangled affairs of Jacobstein, Borer, the exonerating inquiry at Cornell, and the new allegation of misstated camera placement and an invented "observer." In a letter dated July 26, Raub advised Green that, on the basis of information Jacobstein had provided, "no definite conclusions can be drawn regarding any individual's motivations or intent with respect to the changes in the draft manuscripts . . ." Raub asked for more information. Green and Jacobstein promptly complied. The additional information apparently had an impact on NIH. In a letter dated September 15, Raub informed Green that "we are committed to investigate the issues raised by Dr. Jacobstein . . ."

Shortly afterwards, Raub accepted Green's request for a meeting. Held at NIH, it was attended by Green and Jacobstein; Mary Miers, an administrator and legislative liaison specialist on Raub's staff, who was trained in political science; Howard Hyatt, Director of NIH's Division of Management Survey and Review, and several other NIH staff members. The NIH officials said that they would conduct their own investigation of the charges. Assigned to visit the Cornell Medical School to

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... Report Says Borer Admits "Sloppy" Bookkeeping

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investigate the case was a member of Hyatt's staff, Ron Gardiner, who normally conducted financial audits of NIH grants and contracts.

Early in 1983, NIH completed a 9-page, single-spaced "draft report" based mainly on Gardiner's investigation, in which he interviewed Borer and others at Cornell. Titled "Review of Alleged Misrepresentations in Research Papers at Cornell University Medical College," the draft stated that "it does not include any conclusions or recommendations." These presumably would come from higher authorities at NIH, but to get the report in final shape for that step, NIH requested comments from Green and from Joanne Blauer, Secretary of the Cornell Medical College.

The draft stated that the investigation had been conducted into Jacobstein's charges that Borer "was causing, knowingly or carelessly, the introduction of false and self-serving statements into reports on medical research performed on human subjects." It stated that Borer was accused of directing the author of the paper, a medical student, to make alterations that misrepresented the methodology employed in research in the laboratory shared by Borer and Jacobstein. Specifically, it continued, Borer was accused of directing the student to report that "two independent observers" had reviewed the data, when, according to Jacobstein, Borer's judgments had prevailed in evaluating the data; of falsely reporting randomization of patients and the positioning of a camera for cardiac studies; and of reporting readings from a malfunctioning ergometer.

A Mixed Bag of Findings

In addition, the NIH investigation considered the additional charges that Jacobstein had raised—that Borer had invented a second observer in a joint paper that had only one observer listed when it was submitted to the *New England Journal of Medicine* (NEJM). He had also charged Borer with misrepresenting the camera position employed in the research project. Rejected by the NEJM on a variety of grounds—the number of observers and camera position not among them—the paper

was submitted to the *American Journal of Cardiology* (AJC), where it was published in December 1981. In the published version, two observers were mysteriously listed, without his prior knowledge, Jacobstein had charged.

Though without "any conclusions or recommendations," the draft report of the investigation turned up a mixed bag of material about the controversial events in the long-running Jacobstein-Borer case. An outsider might have concluded that, on balance, the NIH findings were favorable to Jacobstein. But the case had developed a peculiar psychology of its own. Green, in behalf of Jacobstein, thundered against the report as containing "preposterous" and "absurd" findings. Cornell raised some objections, but gave the impression of being relatively satisfied with the results of the NIH inquiry.

What was in this crucial document? On the issue of whether "two independent observers" had actually taken part in the research written up by the medical student, the NIH report stated that several cardiology fellows had identified themselves as having, on one occasion or another, served as a "second" observer." But Borer and a former fellow were quoted by the investigation as acknowledging that "Dr. Borer did not write in "blinded" [in the data book] until Dr. Jacobstein began to raise questions about the methodology. Dr. Borer decided that, in the circumstances, he should begin to document the data books fully."

"Tests Not Randomized"—But . . .

Noting that the final draft of the student's paper referred to an unspecified number of "observers"—rather than the "two observers" that Jacobstein had challenged in an early version—the NIH draft report stated: "Dr. Borer said he became less precise in the final draft because the data books would not support 'two' observers. He admitted that the less than fully documented data books was 'sloppy' bookkeeping."

The NIH draft report noted that Jacobstein had charged that when he challenged the claim of "randomization" of patients in a study, the student had told

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ISSN 0048-9581

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Independently published by *Science & Government Report, Inc.*, twice monthly, except once each in January, July, August, and September. Annual subscription: Institutions, \$195.00 (two years, \$340.00). Information about bulk and individual rates upon request. Editorial offices at 3736 Kanawha St. N.W., Washington, DC 20015. Tel. (202) 244-4135. Second-class postage at Washington, D.C. Please address all subscription correspondence to Box 6226A, Northwest Station, Washington, DC 20015. Reproduction without permission is prohibited. SGR is available on Xerox International Microfilms. Claims for missing back issues will be filled without charge if made within six weeks of publication date.

... How "Two Observers" Became One and Again Two

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him—in the words of the NIH report—"that Dr. Borer told him to put that word in." The NIH report then went on to quote the student as having told the NIH investigation that "there was a conscious effort to randomize . . . the tests, but . . . an imbalance in testing order resulted" from problems of patient availability.

"It is clear," the NIH draft stated, "that the tests were not randomized as provided in the [research] protocol." The final draft of the paper replaced "randomized" with "alternated," a term that Borer said was approved by a statistician—later identified by him only as a statistician working for the Environmental Protection Agency.

On the issue of camera positioning for a cardiac-research series, the paper by Borer's student referred to "maximal right and left ventricular separation." Noting that Jacobstein described that as a "falsification," the NIH draft report stated that the medical student and two cardiology fellows "agreed that maximal ventricular separation was not attempted—at least not in most cases

Changes in the Draft

. . . Dr. Borer said he changed [the student's] draft to read 'maximal right and left ventricular separation' because he believed that efforts were being made to achieve maximal separation. He found out later that this was not the case. As noted earlier, Dr. Borer was not present during the taking of the [cardiac films] and, therefore, had no first-hand knowledge of the camera's position."

Regarding the condition of the ergometer for cardiac testing—acknowledged by Jacobstein as a minor point—the NIH draft said that the researchers it interviewed said it had been accidentally doused with coffee, but had functioned properly.

On the newest charge, the one concerning the joint Borer-Jacobstein paper that had been published in the AJC, the NIH draft report stated that, as in the other incident involving camera positioning, Borer "believed the technicians were attempting to achieve maximal separation. As before, Dr. Borer was not present when the [films] were taken for this study and, therefore, had no first-hand knowledge of the camera position used."

The main issue arising from the joint AJC paper was Jacobstein's contention that Borer had misrepresented the number of observers in the research underlying the paper. On that point, the NIH draft report is worth quoting at length:

"We talked with Dr. Borer and the cardiology fellow who was the principal author of this paper. They both told us essentially the same thing. They said that the

early drafts of the paper written by the cardiology fellow contained the statement that there was 'one observer.' Actually, there were 'two observers,' we were told—the cardiology fellow and Dr. Borer. When these early drafts were prepared, Dr. Borer felt that the statement 'one observer' was appropriate because his readings of the [films] predominated over the reading of the less experienced fellow; further, he admitted that pride was involved in his decision to say 'one observer' in these drafts as this would result in more recognition for himself.

"Dr. Borer," the NIH draft report continues, "subsequently changed the paper to read 'two observers' because there were, in fact, two observers, and because he to relieve some of the tension that had developed between Dr. Jacobstein and himself. Dr. Jacobstein had been verbally attacking Dr. Borer because he felt that Dr. Borer had usurped the title 'Director of the Nuclear Cardiology Laboratory'—Dr. Jacobstein contended they were co-directors—and he believed he was not getting appropriate recognition for his abilities and efforts."

The NIH draft report concluded: "By changing the statement to read 'two observers,' it was hoped Dr. Jacobstein would see himself as the second observer, even though this really referred to the cardiology fellow."

The NIH draft added that Borer and the cardiology fellow "believed" that the manuscripts submitted to the *New England Journal of Medicine* and to the *American Journal of Cardiology* both referred to "two observers"—"but they could not produce the draft paper nor the reviewers' comments. Dr. Borer told us [the NIH investigators] that he did not know if the data sheets for this study still exist. But if they do exist, they probably would not show 'two observers.'"

"Incomprehensible," Says Green

Responding in April 1983 to NIH's request for comments on the draft report, Cornell suggested the addition of details on the poor relations between Borer and Jacobstein, along with a reminder that an investigation at Cornell had dismissed the initial charges. As for the charges concerning the AJC paper—which had been raised by Jacobstein after the Cornell investigation was completed—Cornell added a few lines to strengthen Borer's explanation. Throughout the draft, Cornell also suggested various additions or deletions to strengthen its case. But one gets the impression that Cornell was essentially satisfied with the draft report of the investigation.

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... NEJM Review Tends to Support Jacobstein's Case

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That was not the case at all with Jacobstein or his attorney, Harold Green, who submitted his commentary on the NIH draft in August 1983. Consisting of 84 footnotes linked to particular passages in the draft, Green's commentary was attached to a covering letter that declared that "there is very little in your draft report with which we do not take issue." Green asserted that the investigation by NIH had been superficial and amateurish. He noted that "the draft report discusses the data books solely in terms of what the individuals interviewed said about them. It is incomprehensible to us that your investigators did not review the data books, since such review would have demonstrated the palpable inaccuracy of statements made by the individuals who were interviewed."

On the often-referred-to issue of the directorship of the laboratory that was the setting for the Borer-Jacobstein strife, Green asserted that "it is incomprehensible to us that your investigators did not review the data books, since such review would have demonstrated the palpable inaccuracy of statements made by the individuals who were interviewed."

On the often-referred-to issue of the directorship of the laboratory that was the setting for the Borer-Jacobstein strife, Green asserted that "it is incomprehensible that no effort was made to review the official records of the [Cornell Medical School] with respect to this question."

Green's specific comments proceeded in that vein, noting the absence of identification of the statistician who Borer claimed had approved the change from "randomized" to "alternated," as well as the failure of NIH to obtain "an independent statistical opinion" on the matter. Green described Borer's account of the change from two observers to one and then back to two as a "patent absurdity." And he deemed it "incomprehensible that the NIH investigators made no effort to obtain the 'best evidence' from the *New England Journal of Medicine*" concerning the number of observers listed in the Borer-Jacobstein manuscript.

In August 1983, with the comments returned by Cornell and Jacobstein, NIH next turned to reviewing the draft report for preparation of a final report. In the process, it followed up Green's suggestion that it try to obtain the 'best evidence' from the NEJM. The effort did not produce a definitive reply, since the NEJM reported that it had not retained the rejected manuscript. But it did provide a copy of comments by two reviewers, one of which tended to corroborate Jacobstein's contention that the submission to the NEJM included only one observer. The NEJM reviewer of the paper made note of "the observer" and then twice used "he" in regard to that reference.

But soon more fuel was added to the bitter struggle. Two weeks after Green submitted his commentary to NIH, he, in behalf of Jacobstein, presented a new charge of scientific misconduct against Borer. The charge in this case concerned another AJC paper, published in April 1983, co-authored by Borer, along with the medical student from the earlier disputed episodes, and others. Jacobstein contended that the paper falsely stated that a commonly used heart medication, propranolol, had been withheld for given periods from a series of patients undergoing cardiac studies. "Dr. Jacobstein believes that this statement is false," Green wrote to Howard Hyatt, the NIH official directly in charge of investigating the previous charges.

Borer Reports A "Misstatement"

In March 1984, Borer wrote to the editor of the AJC, stating that "my careful review of the raw data reveals that a misstatement, in fact, was made regarding the use of propranolol prior to testing." The published paper had stated that none "was given for at least 24 hours prior to the study." But, Borer conceded, "recent review of the data books" showed that four patients had received "some propranolol, usually in small amounts, during the preceding day." And he added that there was some uncertainty about 10 other patients. Borer concluded his letter of correction to the AJC with an assurance that "I do not believe that the error invalidates the report, either in terms of results or conclusion."

Cornell immediately came to Borer's defense. Writing to NIH Associate Director Raub, the Secretary of the Medical College, Joanne Blauer, asserted, "Clearly Dr. Borer's error is not 'fraud' or 'misconduct in research' because he had no intent or motive to misstate the facts. This was an unintentional error . . ."

Blauer added: "We have spent well over two years investigating and responding to allegations. At this time, the Medical College is ready to put this matter to rest."

But Jacobstein and Green were not—and the NIH officials dealing with this intractable, interminable case obviously felt that the matter was far from settled. Still to come was an incredible face-to-face confrontation between Jacobstein and a delegation of senior NIH officials who met with him in his office in Philadelphia.

In March 1984, Raub, responding to a demand for movement by Jacobstein's attorney, had replied that "we hope to complete our review within the next few weeks." The "final" report was delivered in April 1984. But there was nothing final about it. —DSG

(Next issue. Part III: NIH meets with Jacobstein and convenes a review by outside experts.)

Q&A: NSF Controller Discusses Where the Money Goes

As Controller of the National Science Foundation and Director of the NSF Office of Budget, Audit, and Control, Sandra D. Toye is responsible for knowing where the money goes—\$1.6 billion of it this fiscal year. Toye, who holds a master's degree in economics, was an administrator of NSF oceanographic activities from 1973 until October 1985, when she was appointed to her present post. She spoke November 10 with SGR Editor Greenberg. Following is the transcript, edited by SGR.

•
SGR. Did NSF trim its grants uniformly to meet the Gramm-Rudman requirement of a 4.3 percent reduction in the fiscal year that just ended?

Toye. No. We instructed program managers to try to protect certain kinds of activities. Support for graduate students and instrumentation were high on the list. We also made fewer awards in '86. We tried to keep the average award size up, because, if you're shaving award size, you're shaving a bit here or there on instrumentation and student support.

SGR. Is there a renewal of support for construction?

Toye. We put out an important notice last year, stating that we would accept proposals for facilities construction related to other activities that we were doing. We haven't gotten any proposals, except maybe for two or three.

SGR. How do you account for that?

Toye. Congress charged us to do a survey of the facilities problem, and that survey came out recently (*Science and Engineering Research Facilities at Doctorate-Granting Institutions*, available without charge from NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4787). It found that there has been considerably more construction going on in the last two decades than we hear from the conventional wisdom, which says that everything was built in the post-Sputnik era and then nothing was built since.

It shows a lot of local and state support in the case of public institutions; endowment money and the like in the case of private institutions. The problem is being dealt with pretty well.

SGR. But up till now, a construction "crisis" has been reported in studies of this subject.

Toye. It is perhaps not as serious as we've said. Now, there is a greater problem in the area of renovation and improvements, because a new building is an easier concept to sell to a state legislature or a donor than repainting or fixing the plumbing. Also, NSF has made some investment in facilities for a long time—but it's in things that are not particularly flashy, like upgrading marine

biological stations. On things like the NSF engineering research centers program, we have often found that what the institutions are quite ready to offer, as part of their share, is the space, new or reconfigured. What they're coming to us for is instrumentation, equipment, research money for salaries, student support.

SGR. Does the reported crisis in instrumentation hold up?

Toye. Yes. The point often made by institutions in the survey was that they found it easier to get construction money than outfitting money. The problem is big and it's not been going away. NSF's investment in instrumentation has gone up quite steadily, in absolute dollars and fraction of our budget. We're a little concerned because, to the extent that we can see the trends in some of the other federal agencies, they're not going in the same direction. Which may mean simply that there's some tradeoff—that we're picking up more and perhaps NIH or Defense less.

SGR. There are many complaints about the size of graduate stipends.

Toye. We've looked into that three times in the year that I've been here. The NSF graduate stipend for 12 months is \$11,100. You get into the question of whether the stipend is the sole source of income, and a lot of times it's not. We also make the point that not many people turn them down.

SGR. We're one month into fiscal 1987. Is the money now in hand safe, or is there the possibility of another Gramm-Rudman reduction?

Toye. For '87, it's safe. One of the reasons Congress went to a full-year continuing resolution [for the federal budget] is that partial, typical short-term resolutions could not be used to compute against Gramm-Rudman. So, by using the full year, that combination of expenditures and income was deemed to meet the targets.

SGR. So, NSF and its grantees and contractors can safely assume that what they have, they can keep?

Toye. Yes.

SGR. And how does '87 compare to '86 in terms of funds available to NSF?

Toye. Eighty-seven is a much better year than '86, though not as good as we had hoped for. For NSF as a whole, it's 8.9 percent above '86—post-Gramm-Rudman reductions. It's \$73 million below our request, so we're still sorting out the pieces.

SGR. Are there new emphases in NSF's spending plans—items that have gone up and down?

Toye. There was not a great deal in NSF's '87 proposal that was completely new. New things were being done in the sense that we started new engineering research cen-

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... Mathematics Gets Special Treatment in Budget

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ters; we had new advanced scientific computing centers on line. We did have in the '87 budget a step-up on human resources: support for undergraduate students, minority women—mostly "pipeline," bringing people into the profession. We are still sorting out the budget details [to accommodate the \$73-million reduction in funds sought, and originally planned on, by NSF].

We asked for \$13 million in "new" money for these undergraduate activities of which \$11 million was to be in the research directorates, \$2 million in science education for instrumentation for undergraduate activities. Of that \$13 million, we'll probably field something like \$11 million. Instrumentation and undergraduate participation in research would probably get the biggest piece of that. We also had a new program, for minority research centers of excellence. That program survived. It's \$4 million.

SGR. Congress has mandated specific activities for NSF to support. What are the big segments of that?

Toye. The number of those was larger this year than it has been, and it's one of the reasons we're having so much difficulty settling the current plan. Almost a half-a-billion dollars of ours was earmarked in some way or other. But it isn't all or nothing, or as though the Congress said that NSF should do \$100 million on something and if we had our druthers we'd do zero. Maybe we'd do \$95 million.

Some of the Congressionally earmarked programs are one's they've followed for a long time, like advanced scientific computing centers. All of ocean science, all of astronomy. Although the [legislative] language was a little convoluted, it had the effect of protecting [from budget reductions] all of social and economic sciences, all of biological, behavioral and neural sciences. All of the global geosciences were protected. In science education, \$10 million was added, and the use of that was generally prescribed. In the House, pre-college education was the general thrust for these monies—teacher and materials development. In the Senate, one of the committees recommended putting a big chunk of that into undergraduate programs in the form of instrumentation. So, we're still sorting it out with the Congress.

We will ask [Congress and the Office of Management and Budget] permission to give other than a straight prorated protection to some things, either where conditions have changed or where we attach particular importance. For example, last year, we asked and were granted permission by the Hill to exempt mathematics from Gramm-Rudman cuts because we're making a major effort to increase the number of graduate students in math fields. So, we will probably ask to give some additional protections of that sort [this year].

SGR. In terms of the internal allocations of its budget, NSF doesn't seem to have made any great changes in recent years.

Toye. No enormous changes. There has been differential growth. Engineering has been increasing at a faster rate, but it was very small. It's now about 10 percent of the NSF budget.

SGR. Is there some grand design about how big engineering will become?

Toye. Depends. As a matter of fact, I just read a document that engineering put out expressing their hopes for the future. And their sort of general statement is that engineering should be more or less the same size as the sciences. But surely engineering is on a growth path. This year we formed a new directorate, the Computer and Information Science and Engineering; it's on a growth path and will certainly continue.

On Slow Side of Growth

SGR. What's been on the slow side of differential growth?

Toye. Senior investigator salaries, indirect costs and overhead, and other direct costs. To the extent that fields like math and computer science have been getting a little bit of a boost, other fields have not be growing quite as fast. Within each one you'll see differences. Within the biological sciences, for example, there is a big spurt of activity in biotic systems and resources. Within the physical sciences, math has gotten a bit of a kick. Chemistry got one last year. Since we're on a level and slightly up, nobody's going without.

SGR. The mathematicians strongly insist their work is undersupported.

Toye. In 1986, it was almost \$52 million [in the NSF budget]. There's a gray area with computers, but most of what's funded in math departments would be in that \$52 million. In 1984, it was \$41 million; '85 was \$48 million, and for '87, the request was for almost almost \$60 million, but we haven't settled out the details. One of the things about math is that it's a relatively inexpensive science to do, which means you can get a lot of growth, in terms of numbers of awards and new people, with a fairly modest dollar investment.

SGR. The social sciences went down sharply in financial support early in this Administration and have since made something of a comeback.

Toye. Their '86 was about \$29 million; in the '87 request, they were in for \$38 million. There was [Congressional] language that protects them, not at the full request, but differentially. So, they'll come out somewhere between \$36 and \$38 million.

GAO Studying Peer Review, Japan Grants, NSF Award

The General Accounting Office (GAO), which performs investigations for the Congress, is currently involved with more than its usual quota of studies concerning scientific affairs.

At the request of Senator Mark Hatfield (R-Oregon), outgoing Chairman of the Appropriations Committee, GAO is studying the pattern of distribution of federal funds to universities. The study was inspired by the skepticism that have-not institutions feel toward the peer-review system and its defenders' claims that peer review assures high quality and justice.

As part of the study, the GAO is correlating the distribution of federal academic R&D funds with population and federal programs in research and other fields. It's also examining the peer-review practices of NIH and NSF, and the procedures for financing the national laboratories. The study was originally scheduled for completion by the end of the year, but GAO now says it is likely to be ready for delivery in February. Though the renewed Democratic control of the Senate puts Hatfield out and John Stennis, of Mississippi, in as Appropriations Chairman, the subject of R&D funds is of timeless and intense non-partisan interest.

Back on the GAO agenda is a project that was put aside for a time—a look into the cooperative deals that Japanese companies are cutting with American university researchers and departments (SGR Vol. XVI, No. 8). The study was requested last spring by Senator Lloyd M. Bentsen (D-Texas), who will chair the Finance Committee in the next Congress. Based at GAO's San Francisco office, the study is described as "now back on track."

It was inspired by concern that the Japanese are getting far more than they are giving from their agreements to support research in American universities.

Also in the works at the GAO is what's supposed to be a fast inquiry into complaints from California about NSF's award of a \$5 million startup grant for a \$25 million Earthquake Engineering Research Center at SUNY Buffalo rather than to a consortium consisting of Stanford, Caltech, USC, and UC Berkeley.

NSF insists that the award was strictly on the merits. But the Californians, contending that merit and earthquake vulnerability make them the proper place for the Center, got Senator Pete Wilson (R-Calif.) to request the GAO inquiry. Efforts were made on Capitol Hill to block the payment to Buffalo while the GAO inquiry is underway, but that failed, and NSF says Buffalo has the money and is proceeding.

ISI Software Case Dropped

The US Attorney's office in Philadelphia has quietly discontinued the investigation of software piracy that it undertook last year against Eugene Garfield, President and founder of the Institute for Scientific Information and President, Publisher, and Editor-in-Chief of the new national tabloid *The Scientist* (SGR Vol. XV, No. 19).

In October 1985, FBI agents raided Garfield's headquarters in Philadelphia and a typesetting shop operated by his half-brother in New York. Seized in the raids, according to the FBI, was an unauthorized copy of a \$48,000 typesetting program, Versacomp, manufactured by Pagetec, a California firm. Also seized were several copies of Wordstar programs.

Following the raids, the FBI agent in charge of the case said that a grand jury would be looking into charges of interstate transportation of stolen property, copyright violation, and, possibly, mail fraud.

Pagetec subsequently filed a multi-million suit against Garfield's firm. The case ended with an out-of-court settlement earlier this year. The US Attorney's office initially said that the civil settlement was unrelated to the criminal investigation. Last week, sources in the US Attorney's office told SGR that the case had neither advanced nor been officially dropped, but was no longer under investigation.

A major fallout from the FBI raid was a decision by the *Economist* magazine to terminate plans for joining in a partnership with Garfield to manage and publish *The Scientist*.

Science & Government Report
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Box 6226A
Washington, D.C. 20015

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